This is AN EXAMPLE of the Futar of MICROBES
This SAME METHOD CAN BE USED TO CLEAN UP CALIF. WATER
TULE MARSHS Supply MICROBES IN ABUNDANCE

Bacteria engineered to digest toxic waste

Associated Press

The bacterium Deinococcus radiodurans already holds the title as the world's toughest organism: It can survive an atomic blast. Now scientists have bioengineered it into a "superbug" that can digest the toxic leftovers of the nuclear age.

Government geneticists said they inserted genes from another form of bacteria into Deinoccoccus, producing a superbug that transforms toxic mercury compounds commonly found at nuclear weapons production sites into less harmful forms.

The scientists said the development shows how bacteria can be customized to attack the heavy metals, radioactive wastes and other substances that pollute the soil and groundwater at nuclear sites.

The superbug works in laboratory experiments but has not been tested in the field. Details of the research were published in the January issue of the scientific journal Nature Biotechnology.

The research was led by Michael J. Daley of the Uniformed Services University of the Health Sciences in Bethesda, Md.

According to a federal study, weapons waste was buried at 3,000 sites nationwide between 1945 and 1986. One-third of the sites include radioactive materials. Many of the sites were tanks and concrete-lined pits, which now are disintegrating and leaking. Cleanup estimates by the Energy Department run as high as $300 billion.

Bioremediation — a cleanup method using specialized microorganisms — may be a cheaper alternative. But conventional bacteria that gobble up solvents, metals and other forms of contamination are killed by radiation from plutonium and uranium.

Daley's lab took Deinococcus and added genes from a strain of E. coli bacteria that were resistant to particularly toxic forms of mercury.

They reported that the superbug strains proliferated when exposed to radioactive waste mixtures commonly found at weapons sites. The superbug does not neutralize radioactivity in metals.

The pink-colored bacterium smells like rotten cabbage. It was discovered in canned meat in 1956.

It is believed to be 2 billion years old, making it one of Earth's earliest life forms. Scientists believe it evolved when Earth was bombarded with more radiation than today.

It can survive 1.5 million rads of gamma radiation, or about 3,000 times the lethal dose for humans. It also can survive high doses of ultraviolet radiation and long periods of dehydration.

Previous studies have demonstrated that its radiation resistance probably involves thousands of genes. Even when hundreds of portions of DNA are damaged by radiation, the microorganism can usually repair itself in a matter of hours, using redundant genetic codes to keep functioning in the meantime.